

## **Appendix H**

### **Energy 2001 – Emission Reduction Credit Proposal**

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### **Background**

Energy 2001 installed one landfill gas engine/generator set in 1999 at the Western Regional Landfill, 3195 Athens Avenue, Lincoln, CA. The engine was an Enterprize, Model DGSG38 12x15, 1,688 hp @600 rpm with a low-NOx modification called a controlled rapid burn. Small amounts of diesel was injected along with the landfill gas. This system was operated in 2000 and 2001 but experienced numerous problems. The unit was not operated in 2002.

Energy 2001 was acquired by a new owner last year. The company obtained the necessary permits to replace the one engine/generator with two new units. A copy of the Authority to Construct for the two engines is attached. Each engine is a spark ignited Caterpillar, Model Number G3615, and rated at maximum of 1306 horsepower (hp) at 1,400 rpm. They units are each currently set to run at 1,148 hp at 1200 rpm. The generators are nominally rated at 800 KW. The landfill gas is treated by a gas conditioning skid prior to the engines. The skid is manufactured by LFG Specialties and includes demisters, condensate knockout tanks and carbon filters.

The NOx Best Available Control Technology (BACT) determination for these engines was 0.6 grams per brake-horsepower-hour (g/bhp-hr) based on the, BACT recommendation for reciprocating engines using waste gas in the California Air Resources Board (CARB) Guidance for the Permitting of Electrical Generation Technologies (2002).

Energy 2001 is currently operating both units. Construction was completed this summer and commercial operation was officially established September 9, 2004. Emissions performance testing is scheduled for October 20, 2004.

Energy 2001 has a power purchase agreement with Roseville Electric. This agreement includes an option for Roseville Electric to purchase up to 10 tons of NOx ERCs if emission reductions can be certified.

PCAPCD staff has met with the Energy 2001 to discuss the requirements for obtaining ERCs. Energy 2001 has provided PCAPCD with a history of operations at this site and their intent to certify ERCs. (See attached letter.) Please note that page three of the letter refers to catalytic converters. A selective catalytic reduction (SCR) system using ammonia injection is proposed. Also, there is a reference to a third engine in the letter. Only two engines are permitted. The ERC proposal should be limited to emission reductions from these two engines.

## **NOx Emission Reduction Credits (ERC) Proposal**

Energy 2001 proposes to operate the landfill gas engines to establish historical actual emissions. They estimate NOx levels of 6,700 pounds per quarter to 10,000 pounds per quarter. Subsequently, up to 90% reduction of NOx emissions are proposed from the installation of a selective catalytic reduction (SCR) system on each engine.

If these emission levels were established as historical actual emissions and NOx levels were reduced by 90%, NOx emission credits would be calculated as follows:

$$\text{NOx Emission Reductions} = \text{Historical Actual Emissions} - \text{New Potential to Emit}$$

The quantity of emission reductions are adjusted for the PCAPCD Priority Reserve as follows:

$$\text{Adjusted Emission Reduction} = \text{NOx Emission Reductions} / 1.05$$

When used as offset, the ERCs are further adjusted by dividing by the offset ratio. The offset ratio required for use as offsets at the Roseville Energy Park (REP) is 1.3.

For example, if the historical actual emissions were demonstrated at 10,000 pounds per quarter, the emission reductions, assuming 90% control, would equal 9,000 pounds per quarter or 18 tons per year (tpy). The emission reduction credits issued would have a value of 9,000/1.05 or 8,571 pounds per quarter (17.1 tpy). After an offset ratio of 1.3, the offset value would be 13.2 tons per year if used by the REP.

If the historical actual emissions were demonstrated at 6,700 pounds per quarter, the emission reductions, assuming 90% control, would equal 6,030 pounds per quarter or 12.06 tons per year (tpy). The emission reduction credits would have a value of 6,030/1.05 or 5,743 pounds per quarter (11.5 tpy). After an offset ratio of 1.3, the offset value would be 8.8 tons per year if used by the REP.

If the historical actual emissions were demonstrated at 3,350 pounds per quarter, the emission reductions, assuming 90% control, would equal 3,015 pounds per quarter or 6.03 tons per year (tpy). The emission reduction credits would have a value of 3,015/1.05 or 3,015 pounds per quarter (5.75 tpy). After an offset ratio of 1.3, the offset value would be 4.4 tons per year if used by the REP.

### **Discussion**

There are a number of technical and regulatory requirements which must be met before NOx ERCs could be issued.

The technical issues primarily involve (1) demonstration of historical actual emissions, (2) removal of contaminants from the landfill gas to clean up the gas to a level that allows continuous operation of the both the engines and the installation and operation of the SCR system at a high control efficiency and (3) demonstration of reductions by emissions testing.

### **Historical Actual Emissions**

The demonstration of historical actual emissions require development of NOx emission factors for these specific engines. A non-resettable fuel meter is required by the permit. Emission factors would be based on source test data and calculated as follows:

$$(\text{NOx pounds per hour}) / (\text{standard cubic foot per minute (scfm)} \times \text{Btu per scfm}) =$$

## NOx (lbs per Btu)

Source testing is required within 60 days of startup. The testing is scheduled for October 20, 2004. A recording of the landfill gas flow to the engines is required on an hourly basis. Records of total cubic feet of landfill gas consumed per hour and Btu content per cubic foot of gas would be used to calculate quarterly emissions of NOx. The Btu content of the landfill gas is to be determined by sampling during emissions testing using ASTM Method 1945/3588.

Cubic foot gas per quarter x average Btu/cubic foot x NOx (lbs per Btu)

## Removal of landfill gas contaminants

Landfill gas contains contaminants that must be removed to allow successful operation of engines or air pollution control equipment. The contaminants vary at each landfill depending on the type and quantity of waste in the landfills. The difficulty and cost of cleanup of the landfill gas is a significant issue when attempting the use of an SCR system to control NOx emissions from landfill gas engines. PCAPCD has not found any cases where the SCR systems have been utilized. However, U.S. EPA has conducted two fuel cell landfill gas demonstration projects with International Fuel Cells Corporation. These required similar level of removal of contaminants from the landfill gas.

The demonstration projects operate fuel cells at the Penrose Landfill in greater Los Angeles and at the Groton Landfill in Connecticut. The gas cleanup system operated approximately 6,500 hours and the fuel cells were operated for 4,000 hours. Attached is a document summarizing the operations written by Mr. R. J. Spiegel, U.S. EPA, National Risk Management Research Laboratory, Air Pollution Prevention and Control Division, Research Triangle Park, North Carolina. PCAPCD staff called Mr. Spiegel. He indicated this was a successful operation. The gas cleanup system utilized a cooled carbon bed.

The next four paragraphs describe potential contaminants. Siloxanes may be present in landfill gas. These can be damaging to landfill gas engine components. They can poison or mask exhaust catalysts. The LFG Specialties gas conditioning skid is currently installed and guaranteed to remove siloxanes. Sampling for siloxanes has occurred and the results have been requested by PCAPCD.

Sulfur compounds are present in landfill gas. Samples taken of the gas in the year 2001 indicated hydrogen sulfide (H<sub>2</sub>S) and traces of other sulfur compounds were in the gas at a concentration of 28 ppmv. Additional sampling will be required to determine what is the current concentration in the landfill gas after conditioning and prior to the engines. The concern is that the catalyst in the SCR system may be affected by the sulfur.

If needed, an H<sub>2</sub>S removal skid could be added to the landfill gas cleanup system. For example, the PCAPCD contacted Gas Technology Products in Schaumburg, Illinois. The company offers either custom or package systems for H<sub>2</sub>S gas removal. They indicated experience with sulfur removal on applications including landfill gas. The resulting sulfur collected could be disposed of in the landfill or sold commercially.

Trace quantities of heavy metals may be found in elemental and compound form including arsenic, cadmium, chrome, copper, lead, magnesium, mercury, nickel, tin, and zinc). Halides may be present. These may be removed by the existing gas conditioning skid. However, additional sampling is required to verify.

## Regulatory Requirements

The regulatory requirements for certification of ERCs are contained in PCAPCD Rule 504, Emission Reduction Credits. These are summarized below:

1. Historical actual emissions must be established for each quarter. Only actual emission reductions may be certified as ERCs. Normally the historical actual emissions are based on the last two years of operation. However, a shorter averaging period of at least one year may be used for an emission unit in operation for less than two years, provided the averaging period is representative of the full operational history of the emissions unit. Note: For the purposes of Rule 504, PCAPCD considers a year to be twelve continuous months.
2. Initial source testing is scheduled for October 20, 2004. Source testing for NO<sub>x</sub>, CO and VOCs is required at least every other year. Source testing will be required before and after installation of the air pollution control equipment for the purposes of obtaining ERCs.
3. An Authority to Construct application will be required prior to the addition of air pollution control equipment to the landfill gas engines. The application may be filed at any time.
4. A separate application for ERCs must be submitted to the District. The application must be filed after historical actual emissions are established. The application may be filed prior to the actual emissions reductions occurring but would not be approved until the emission reductions were demonstrated.
5. Emission reductions must meet all requirements of Rule 504, Emission Reduction Credits. Reductions must be real, enforceable, quantifiable, and permanent.
6. Actual emission reductions must be adjusted to at least reflect emission rates achievable with reasonably available control technology (RACT) or best available retrofit control technology (BARCT), whichever results in the greatest adjustment. At the Authority to Construct was issued, the engines were required to meet BACT. BACT is an emission rate or control device more stringent than RACT or BARCT. This adjustment should not be required. A determination will be made by PCAPCD based on RACT/BARCT at the time the application is complete. Reductions are also adjusted by 1.05 for the PCAPCD Priority Reserve.
7. A preliminary decision must be made by the PCAPCD.
8. Publication of a notice of the preliminary decision and a Public Comment period of 30 days is required. The preliminary decision must be forwarded to the California Air Resources Board, the U.S. EPA and, in this case, the Energy Commission.
9. Final Action must be taken by the PCAPCD after considering all comments.
10. Emission reduction credits must be transferred to Roseville Electric.
11. The landfill gas engines will be required to continue operation at the reduced emission levels during the expected life of the Roseville Energy Park. Discontinuing operation and diversion of landfill gas to other emissions units with higher levels of quarterly emissions will reduce or void the emission reduction credits.

## Summary

The engines at Energy 2001 began commercial operation in September 9, 2004. There is sufficient landfill gas to operate the two engines continuously.

Energy 2001 has proposed to establish historical actual emissions and subsequently install an SCR control system to reduce emissions. The company intends to apply for emission reduction credits for NOx. Roseville Electric has an option agreement to purchase up to 10 tons of NOx (on an annual basis) if certified.

In addition, there are a number of issues that must be demonstrated or addressed. These include:

1. Continuous operation of the landfill gas engines
2. Cleanup of the landfill gas to low levels to prevent poisoning of the catalyst in the SCR system.
3. Design of the SCR system.
4. Sampling and emissions testing after installation of the system
5. Demonstration that the SCR system will continue to operate at required control levels. This will require at least six months of operation initially prior to emissions testing.

The length of time required to certify ERCs would include a minimum of one year of operation using the equipment currently operating and six months of operation with the SCR system. Permitting, design, installation and source testing could be completed immediately after or during these operations. It is likely that several additional months minimum would be added to the process.

The Energy 2001 proposal to obtain ERCS involves some uncertainty, particularly the cleanup of the landfill gas sufficiently to allow operation of an SCR system. However, the U.S. EPA demonstration project using landfill gas with fuel cells does indicate there is technology available and cleanup is feasible. The PCAPCD concludes that the overall ERC proposal is feasible. As with any ERCs, the burden is on the applicant to demonstrate the reductions and meet all requirements.

Attachment: Authority to Construct  
Letter from Energy 2001, Inc. (8/5/04)  
Fuel Cell Operations On Landfill Gas by R.J. Spiegel

PLACER COUNTY APCD  
11464 B Avenue - Auburn, California 95603  
(530) 889-7130 - Fax (530) 889-7107

**AUTHORITY TO CONSTRUCT\  
TEMPORARY PERMIT TO OPERATE**

**ISSUED TO:**

ENERGY 2001, INC  
MANSFIELD W. GARRET  
1850 MAPLE AVE.  
SAN MARTIN, CA 95046

**PERMIT NUMBER:**

AC-04-09

**FACILITY LOCATION:**

3195 ATHENS RD.  
LINCOLN, CA 95648

**EXPIRATION DATE:**

1/1/2005

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Thomas J. Christofk  
Air Pollution Control Officer

08/20/2004

Issue Date

**PROCESS DESCRIPTION:** MODIFY ENER-00-01 TO REPLACE EXISTING ENGINE WITH TWO NEW ENGINES

**EQUIPMENT**

No.	Equipment	Rating
1	Engine/Generator #1, Engine Mfr: Caterpillar, Model: G3615, Serial Number: N/A, Fuel Type: Landfill Gas, Power Rating: 1306 hp, Air/Fuel Ratio Controller, Generator Mfr: Power Lynx, Model: XLM304000/1600, Power Rating: 800 kw.	MBTU - 11,100.
2	Engine/Generator #2, Engine Mfr: Caterpillar, Model: G3615, Serial Number: N/A, Fuel Type: Landfill Gas, Power Rating: 1306 hp, Air/Fuel Ratio Controller, Generator Mfr: Power Lynx, Model: XLM304000/1600, Power Rating: 800 kw.	MBTU - 11,100.

**TOTAL RATINGS** - MBTU - 22,200.

**SPECIAL**

1. This Authority to Construct replaces all equipment and conditions of Permit to Operate ENER-00-01.

**OPERATING CONDITIONS**

2. The listed engines shall use landfill gas as the sole fuel.

3. The engines shall be fitted with non-resettable fuel consumption and non-resettable elapsed operating time indicators. The fuel meter may be for the two engines combined.
4. The landfill gas flowrate to the engines shall be monitored at least every 15 minutes and recorded once per hour.
5. The plant owner shall prepare and submit an Engine Operator Inspection Plan as required by District Rule 242, Stationary Internal Combustion Engines. The Permit to Operate will not be issued until the Plan has been approved by the District.

## **RECORDKEEPING AND REPORTING**

6. Maintenance and breakdown records, and operation data shall be maintained and summary reports submitted to the District. Records from monitoring equipment shall be kept by the Owner or Operator for a period of two (2) years, and shall be made available to the District's inspector upon request. Operational data shall include for each engine, but is not limited to, engine/generator operating hours, electrical power produced, and quantity of landfill gas utilized by the engines. These records shall be summarized by quarter and available for review within 30 days of the end of each quarter.

## **PERFORMANCE TESTING**

7. Sampling Ports and Platforms: Access to exhaust stacks shall be provided by test platforms or other means, and sampling ports shall be installed in accordance with 40 CFR 60.8(e), and the District's Platform and Port Specification Sheet.
8. The following performance tests shall be completed within sixty (60) days of startup and every 24 months thereafter: Tests shall be performed with engine/generator operating at greater than 90% of rated capacity.
  - A. Non-Methane Hydrocarbons Organic Compounds shall be measured at the inlet and the exhaust using the EPA method 25 modified to delete the condensate trap from the sampling train.
  - B. The inlet flowrate shall be measured using EPA Method 2 or the continuous flow measuring system.
  - C. The exhaust flow shall be determined by EPA method 2 or the "F" factor method in the Code of Federal Regulations Part 60.45(f)(5).
  - D. Nitrogen oxides emissions in pounds per million Btu shall be determined using EPA Method 7.
  - E. Carbon Monoxide emissions in pounds per million Btu shall be determined using EPA Method 10.
  - F. Oxygen concentration shall be determined using EPA Method 3A.
  - G. Gross Calorific Value of the landfill gas shall be measured using ASTM D 1826-77.
  - H. The inlet gas shall be sampled at the time of the test using ASTM 1945/3588 for Btu, C1-C6 for hydrocarbons, CO<sub>2</sub>, O<sub>2</sub>, and N<sub>2</sub>.
9. The electrical power in kilowatts produced during testing shall be recorded and reported in the test reports.

## EMISSIONS LIMITATIONS

10. **Emissions Limitations :**

- A. No emissions are permitted, from any source, which are a nuisance per District Rule 205.
- B. Stack emission opacity as dark or darker than Ringelmann No. 1 (20% opacity) for a period or periods aggregating more than three (3) minutes in any one hour is prohibited and is in violation of District Rule 202, Visible Emissions.
- C. In accordance with District Rule 210(A)(2)(b), Specific Contaminants, combustion contaminants (particulate matter which contains carbon in either the free or combined state) may not exceed a concentration of 0.1 gr/dscf at point of discharge calculated at 12% CO<sub>2</sub>.

11. The units shall each meet either of the following requirements:

- A. Have a non-methane organic compound (NMOC) destruction/treatment efficiency of at least 98% by weight, or
- B. Reduce the NMOC concentration at the outlet of the control device to 30 ppm measured as methane and corrected to 3% oxygen.

12. Emissions of Nitrogen Oxides shall not exceed 0.6 grams per brake horsepower-hour.

13. Emissions of Reactive Organic Compounds shall not exceed 0.6 grams per brake horsepower-hour.

14. Emissions of Carbon Monoxide shall not exceed 2.5 grams per brake horsepower-hour.

15. Emissions of NO<sub>x</sub> shall not exceed 150 ppmv and CO shall not exceed 2000 ppmv, both corrected to 15% O<sub>2</sub>, to comply with Rule 242.

16. The emissions from the two engines combined shall not exceed the following rates:

POLLUTANT	LBS/QUARTER
Reactive Organic Compounds	8,150
Nitrogen Oxides (NO <sub>x</sub> ):	10,187
Sulfur Oxides (SO <sub>x</sub> ):	5,086
PM-10:	6,358
Carbon Monoxide (CO):	31,787

## GENERAL CONDITIONS

17. Authorization to construct the equipment listed and as prescribed in the approved plans and specifications is hereby granted, subject to the specified permit conditions. The construction and operation of listed equipment shall be conducted in compliance with all data and specifications submitted with the application under which this permit is issued unless otherwise noted in the conditions. Deviation from the approved plans is not permissible without first securing approval for the changes from the Air Pollution Control Officer. (Rule 501)

18. Written notification shall be submitted to the District no later than seven (7) days after completion of construction. (Rule 501)

19. This permit shall be maintained on the premises of the subject equipment. (Rule 501)
20. The authorized District agents shall have the right of entry to any premises on which an air pollution emission source is located for the purpose of inspecting such source, including securing samples of emissions therefrom, or any records required to be maintained therewith by the District. (Rule 402)
21. In the event of any violation of the District Rules and Regulations, the company shall take action to end such violation. (Rule 502)
22. The company shall notify the District within two hours of any upset conditions, breakdown or scheduled maintenance which cause emissions in excess of limits established by District Rules and Regulations. (Rule 404)
23. Any alteration of the subject equipment, including a change in the method of operation, shall be reported to the District. Such alterations may require an Authority to Construct Permit. (Rule 501)
24. Exceeding any of the limiting conditions is prohibited without prior application for, and the subsequent granting of a permit modification pursuant to District Rule 501, General Permit Requirements, Section 400.
25. In the event of a change of ownership, an application must be submitted to the District. Upon any change in control or ownership of facilities constructed, operated, or modified under authority of this permit, the requirements contained in this Authority to Construct shall be binding on all subsequent owners and operators.(Rule 501)
26. **Title V Recordkeeping Requirements:** Recordkeeping and reporting pursuant to District Rule 511, Potential To Emit, shall be performed if the facility emissions exceed any of the following in any 12 month period:
  - A. 5 tons per year of a regulated air pollutant (excluding HAPs);
  - B. 2 tons per year of a single HAP;
  - C. 5 tons per year of any combination of HAPs;
  - D. 20 percent of any lesser threshold for a single HAP that the United States Environmental Protection Agency (U.S. EPA) may establish by rule.
27. **Title V Operating Limitations:** The Owner/Operator shall file an application pursuant to Rule 512, Request for Synthetic Minor Source Status or Rule 507, Federal Operating Permit Program if the facility emissions exceed any of the following in any 12 month period:
  - A. 12.5 tons of nitrogen oxides, 12.5 tons of volatile organic compounds, 50 tons of sulfur oxides, 50 tons of PM-10 or 50 tons of carbon monoxide;
  - B. 5 tons of a single hazardous air pollutant (HAP);
  - C. 12.5 tons of any combination of HAPs;
  - D. 50 percent of any lesser threshold for a single HAP as the U.S. EPA may establish by rule.
28. **Performance Test Requirements:** If the District finds that performance tests are required to determine compliance with District Rules and Regulations and Conditions of this Authority to Construct, reasonable written notice shall be provided to the Company. The performance tests shall be subject to the following restrictions:
  - A. At least thirty (30) days prior to the actual testing, a written test plan shall be submitted to the Air Pollution Control Officer detailing the sampling methods, analytical methods or

detection principles to be used. The prior written approval of the Air Pollution Control Officer is required for the use of alternate test methods.

- B. The District may require, upon reasonable written notice, the conduct by the company of such emissions testing or analysis as may be deemed necessary by the District to demonstrate compliance with District Rules and Regulations and the limiting conditions of this permit.
  - D. A report of the testing shall be submitted to the District no later than sixty (60) days after the source test is performed.
29. Compliance of the permitted facility is required with the provisions of the "Air Toxics `Hot Spots' Information and Assessment Act" of 1987 (Health and Safety Code Sections 44300 et seq.).



ENERGY 2001, INC.  
A Renewable Resource Company

RECEIVED

AUG 9 2004

PLACER COUNTY AIR POLLUTION  
CONTROL DISTRICT

August 5, 2004

John Finnell, Sr. Air Pollution Control Engineer  
Placer County Air Pollution Control District  
11464 B Avenue  
DeWitt Center  
Auburn, CA 95603

RE: LINCOLN LANDFILL GAS PLANT

Dear John:

Roseville Electric has requested that we write to you to describe the increased viability of the *new* Energy 2001 in contrast to the *former* Energy 2001 and our plans for emissions reductions upon the establishment of an emissions baseline. It is important to realize that significant differences exist in both the technical equipment and the commercial conditions for the former and new companies. Below is first a discussion of the technical differences, followed by a discussion of commercial matters and the potential to certify new NOx emission reduction credits.

#### FORMER ENERGY 2001

The power plant at the Lincoln landfill was conceived by Brad Reeves, a hydropower plant owner/operator. Mr. Reeves enlisted the financial help of his father-in-law, David Fitzpatrick, in 1995. Originally, the two gentlemen believed that the plant could be built for a few hundred thousand dollars. The design of the plant was by Brad Reeves who had absolutely no experience designing a methane power plant. To keep costs down, Mr. Reeves and Mr. Fitzpatrick purchased used equipment and ultimately designed the system around a 1200kW Enterprise diesel engine they purchased for \$30,000. The company was named Energy 2001 and incorporated sometime in 1999. Ultimately, close to one million dollars was invested in the facility.

As it turns out, the facility never had a chance. The 1200kW Enterprise engine was designed for diesel fuel, not methane. Mr. Reeves was convinced that he could convert the 1967 engine into a landfill gas engine. Diesel engines require significantly cleaner fuel than landfill gas engines. Mr. Reeves' design relied upon a knockout tank to remove the impurities in the methane. This system proved insufficient and resulted in continuous failure of the engine. As a result, these engines rarely ran.

## NEW ENERGY 2001

Energy 2001 ("Energy") today is an entirely different company, purchased by new owners committed to a successful landfill gas power generation project. Only \$400,000 in equipment out of the \$1,000,000 spent by our predecessors was determined useable. Energy replaced the 1200 kW Enterprise diesel engine with two new CAT 3516 landfill gas engines including Woodward Digital Engine Management System fuel controller (regulates emissions and engine performance). In place of the single condensate knockout, Energy purchased two LGE Specialties proprietary gas conditioning skids, including demisters, condensate knockout tanks, and compressed carbon filters. The pieced together control room was replaced with a state-of-the-art switchgear control center. Furthermore, deficiencies in the protection gear were identified and a new ground fault sensing system and a new back-up battery system were installed. Energy also purchased a new 480V/12KV transformer, a small flare and other equipment. In total, Energy has spent an additional \$1,800,000 on new equipment specifically designed and built for the landfill gas facility.

On Thursday night, July 28<sup>th</sup>, Energy passed PG&E's pre-parallel test and was permitted to commence supplying the Grid with up to 1650kW from the plant. Since that date Energy has been supplying the Grid with test energy while fine-tuning the engines for optimum performance. We expect to commence operations 24 hours a day 7 days a week by the end of the week.

## COMMERCIAL CONDITIONS

The former Energy 2001 rarely ran, and only was able to sell what power it generated into the spot market, at very low pricing. Energy has signed a power purchase agreement (PPA) with Roseville Electric whereby ALL of the energy produced by Energy from the facility will be purchased at firm pricing. This PPA allowed the new project to be financed after a due diligence review by the lender. This due diligence review comprised both commercial and technical issues, including the performance guarantees Energy has from the equipment suppliers. The agreement with Roseville Electric also includes an option by Roseville Electric to purchase any NOx emission reduction credits created from the facility. Based on the terms of the PPA to purchase all power generated, and the expected performance of the facility that has been designed specifically for landfill gas fuel, Energy expects to operate the facility continuously except for periods of maintenance.

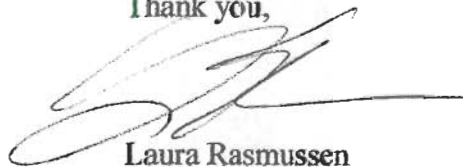
## EMISSIONS REDUCTIONS CREDITS

Catalytic converters are required equipment on new natural gas plants. Few landfill gas plants have successfully implemented the technology, and catalytic converters are not considered Best Available Control Technology for landfill gas plants. The main obstacle preventing successful reduction of emissions from landfill gas plants using catalytic converters is the lack of sufficiently clean fuel. Energy 2001 has installed LFG Specialties proprietary gas conditioning skid on each of its two engines. LFG Specialties guarantees the gas conditioning skid to remove 99.9% of the impurities from the landfill gas. Catalytic converter engineers we contacted during the bidding of the construction of the plant stated they could reduce the emissions generated by the Caterpillar engines 90 to 95% given removal of 99.9% of the impurities.

Energy 2001's air permit, AC-04-09, allows energy to generate up to 10,000 lbs. of NOx emissions per quarter. We expect to generate a baseline of 6,700 to 10,000 lbs. (depending on whether the landfill produces sufficient gas to install a third engine) of NOx emissions per quarter. A 90% reduction in emissions could qualify Energy 2001 to certification of at least 10 to 15 ton per year emissions reduction credits.

Should you have any further questions, please do not hesitate to contact me.

Thank you,



Laura Rasmussen

cc: Bob Hren, Roseville Electric

# FUEL CELL OPERATION ON LANDFILL GAS

R. J. Spiegel

For presentation at the EPA Fuel Cell Workshop  
to be held in Cincinnati, Ohio on June 26-27, 2001

U.S. Environmental Protection Agency  
National Risk Management Research Laboratory  
Air Pollution Prevention and Control Division  
Research Triangle Park, NC 27711

## FUEL CELL OPERATION ON LANDFILL GAS

R. J. Spiegel

The U.S. Environmental Protection Agency (EPA), in conjunction with International Fuel Cells Corporation, conducted two projects to define, design, test, and assess a fuel cell energy recovery system for application at solid waste facilities (landfills). The projects were the first usages of fuel cell technology for operation on landfill gas. EPA has promulgated standards and guidelines for the control of air emissions from municipal solid waste landfills. Landfill gas is produced as a result of a natural biological reaction whereby microbes consume organic matter in the absence of  $O_2$  and convert the solids to a gas containing methane in the range of 50% by volume. The other major constituents of landfill gas are:  $CO_2$  ~32%,  $N_2$  ~17%, and  $O_2$  ~1%. Additionally, landfill gas contains trace amounts of fuel cell contaminants consisting of sulfur-bearing compounds (principally  $H_2S$ ) and halogen compounds. The two projects addressed two major issues: development of a cleanup system to remove fuel cell contaminants from the gas and testing/assessment of a modified phosphoric acid fuel cell power plant (ONSI PC 25) which operated on the cleaned, but dilute, landfill gas.

Performance data were collected at two sites determined to be representative of the U.S. landfill market. At the first test site (Penrose), located in greater Los Angeles, CA, landfill gas was gathered and recovered from four nearby landfills comprised primarily of industrial waste material. This gas had a heating value of about 16.6 kJ/SL at 44% methane concentration. After tests were concluded at Penrose, the equipment (fuel cell and gas cleanup unit) was moved to the Groton, CT, landfill. This was a relatively small landfill, but methane levels were higher (~50%) with a corresponding greater heat content of 18.6 kJ/SL.

The assessment/test at these sites primarily addressed contaminant removal efficiency of the cleanup system, power production of the fuel cell system, and fuel cell exhaust emissions. The gas cleanup unit logged approximately 6500 hours between the two sites and removed total sulfur (as  $H_2S$ ) to levels below 0.047 and 0.022 ppbv at Penrose and Groton, respectively. Total halides (as Cl) at Penrose and Groton were reduced to levels below 0.032 and 0.014 ppbv, respectively. These very small outlet concentrations reflect greater than 99% removal efficiency, and thereby protect the fuel cell's catalysts for their projected operating life of 40,000 hours. The fuel cell was operated for ~ 700 hours at Penrose and for ~ 3300 hours at Groton with adjusted availability of over 96% at both sites. The power produced at Penrose peaked at 137 kW, while the Groton landfill produced a maximum power output of 165 kW due to a higher energy gas. The overall fuel cell efficiency was determined to be 37 and 38% at Penrose and Groton, respectively. Fuel cell emissions, as actual dry concentrations, were measured according to EPA methods and are as follows:  $SO_2$  emissions were below the method detection limit of 0.23 ppmv;  $NO_x$  emissions averaged 0.12 ppmv; and CO emissions were near the detection limit, averaging 0.77 ppmv.

## **APPENDIX I**

### **Comment Letters Received By PCAPCD on the Preliminary Determination of Compliance**

## CALIFORNIA ENERGY COMMISSION

1516 NINTH STREET  
SACRAMENTO, CA 95814-5512



June 25, 2004

**RECEIVED**

JUN 29 2004

Mr. John Finnell  
Senior Air Pollution Control Engineer  
Placer County Air Pollution Control District  
11464 B Avenue  
Auburn, CA 95603

PLACER COUNTY AIR POLLUTION  
CONTROL DISTRICT

Dear Mr. Finnell:

The California Energy Commission (Energy Commission) staff has reviewed the Preliminary Determination of Compliance (PDOC) for the Roseville Energy Park (REP), received from the Placer County Air Pollution Control District on May 25, 2004. The Energy Commission oversees power plant compliance through conditions of certification placed on the project at the time of licensing and as amended throughout the life of the project. Staff offers the enclosed comments for your consideration.

If you have any technical air quality questions or need additional information, please contact Joe Loyer of my staff at (916) 654-3842.

Sincerely,

TERRENCE O'BRIEN, Deputy Director  
Systems Assessment and Facilities Siting

Enclosure

cc: Joe Loyer

## STAFF COMMENTS REGARDING THE PRELIMINARY DETERMINATION OF COMPLIANCE

---

Staff has reviewed the analysis and conditions proposed by the Placer County Air Pollution Control District (May 2004). Staff offers the following comments for your consideration regarding the proposed conditions.

### **Conditions 3 through 11:**

These conditions are a combination of project elements that will be fully complied with prior to the issuance of the Final Determination of Compliance. They include the identification of project emissions to be offset, offset ratios, an inter-pollutant offset ratio and a recantation of several District Rules. Staff suggests that it is unnecessary to include these conditions in the Final Determination of Compliance, the Authority to Construct, or the Permit to Operate. Therefore, staff respectfully requests that the PCAPCD consider deleting these conditions from the PDOC and FDOC.

**Condition 21** requires that the CEMS be operational prior to the initial startup of the turbines. It has been staff's experience that the CEMS is unreliable, and may even be damaged if installed prior to the SCR and oxidation catalyst becoming operational. The SCR and oxidation catalyst will not be operational until after the turbines begin commissioning, which occurs after the initial startup of the turbine. Thus, staff is unsure of the PCAPCD's intent regarding the timing of the CEMS operability. Staff recommends that CEMS operation be required prior to the cessation of commissioning when their operability will be confirmed by source testing.

**Condition 28** limits unabated operation during commissioning to 160 hours, with no ultimate limit on the total duration of commissioning. Staff recommends that the total duration of commissioning be limited to no more than 33 days, which is generally comparable to recent licensing cases.

The compliance with **Condition 29** depends on the operability of the CO portion of the CEMS, which may not be available until later in the commissioning period. Staff recommends that the PCAPCD determine a conservative, fuel-based CO emission factor as a surrogate until the CO CEMS is operable.

**Condition 31** requires the development of a NO<sub>x</sub> emission factor specifically for the REP. Staff recommends that, in addition to NO<sub>x</sub>, the PCAPCD consider the same requirement for CO and the other pollutants that are not monitored by the CEMS (VOC, PM<sub>10</sub> and SO<sub>x</sub>).

**Condition 53** sets the ammonia slip limit to 10 ppmv, but does not designate the percent oxygen, averaging period, or methodology to determine compliance. In the Preliminary Staff Assessment, staff is recommending that REP be limited to no more than 5 ppm @ 15% O<sub>2</sub> averaged over three hours to be consistent with CARB, EPA and South Coast Air Quality Management District recommendations for combined cycle power plants. Therefore, staff recommends that the PCAPCD modify the condition to read "5 ppmv @ 15% O<sub>2</sub> averaged over three hours, and include the following protocol

for determining compliance, which is a typical method used by the San Joaquin Valley Air Pollution Control District:

Compliance with ammonia slip limit shall be demonstrated by using the following calculation procedure:

ammonia slip ppmv @ 15% O<sub>2</sub> =  $((a - (b \times c / 1,000,000)) \times 1,000,000 / b) \times d$ ,

where

a = ammonia injection rate (lb/hr) / 17 (lb/lb. mol),

b = dry exhaust gas flow rate (lb/hr) / (29 (lb/lb. mol),

c = change in measured NO<sub>x</sub> concentration ppmv at 15% O<sub>2</sub> across catalyst, and

d = correction factor.

The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip.

**Condition 65** requires the submittal of the cooling tower drift eliminator design 30 days prior to the "commencement of construction." In order to provide more flexibility during construction, staff has found it reasonable to allow the cooling tower design to be submitted 30 days prior to the commencement of construction of the cooling tower.

**Condition 86** allows the firewater pump to be tested up to 100 hours in a year; however, the PDOC calculations assumed that the firewater pump would be tested for no more than 50 hours per year. Staff recommends that the condition correspond with the PCAPCD calculation in the PDOC.

**Condition 88** for the firewater pump and **Condition 101** for the emergency generator restrict the firewater pump to using 500-ppm sulfur content diesel fuel. Staff recommends that applicants use 15-ppm sulfur content diesel fuel, since it is reasonably available, reduces emissions of particulate matter, and presents no significant financial burden to the applicant.

**From:** <Sims.Mark@epamail.epa.gov>  
**To:** <JFinnell@placer.ca.gov>  
**Date:** Mon, Jul 19, 2004 2:48 PM  
**Subject:** EPA Comments -- Roseville Energy Park PDOC

John,

The following are my comments on the May 25, 2004, PDOC for the Roseville Energy Park (REP) project:

1. **CO BACT.** The PDOC proposes 4.0 ppmvd @ 15% O2 3-hour rolling average as CO BACT for this project. EPA recommends that CO BACT for this project be set at 2.0 ppmvd @ 15% O2 3-hour rolling average. Table B3 in the PDOC (BACT determinations for gas turbine projects recently approved by the CEC) lists CO BACT for the City of Vernon project as 2 ppmvd. However, there is no discussion in the CO BACT determination as to why 2 ppmvd was not considered for CO BACT for this project.

2. **Daily v. Yearly Emission Limits.** EPA is confused by the daily versus yearly emission limits presented in the PDOC emission tables. The daily emissions appear to be about double the yearly emissions. (Example: for the Alstom turbines, daily NOx emissions are about 406 lbs/day.  $406 \text{ lbs/day} \times 365 \text{ days} = 148,190 \text{ lbs/year}$ . However, the yearly NOx emissions for the Alstom turbines are listed in the tables as 39 tons/year.)

Are the daily versus yearly emissions correctly listed in the PDOC? The yearly numbers imply that the facility will only operate at slightly more than half capacity/half time yet the PDOC states that the facility may operate 24 hours/day, 7 days/week. The PDOC should be revised to address this apparent discrepancy.

3. **NH3 Slip.** The PDOC sets the NH3 slip rate at 10 ppm. EPA recommends that the District set the NH3 slip rate at 5 ppm. (There is no discussion in the PDOC concerning the 10 ppm NH3 slip rate.)

4. **Interpollutant Offsets -- VOC for NOx.** There is no final national EPA policy on interpollutant trading for NSR offsets or on how trading ratios should be determined. Nevertheless, EPA Region 9 has accepted several such trades on a case by case basis. Based upon the small size of the emissions involved, and the high trading ratio proposed, EPA has no objection to the VOC-for-NOx ratio of 5.2 proposed for the Roseville Energy Project.

5. **Cold Start Performance Testing.** See page 52, Specific Facility Condition 47. EPA recommends that initial cold start NOx/CO performance testing be conducted on both turbines.

6. **CEMS QA/QC Plan.** EPA recommends that the District add to the Reporting/Recordkeeping section of the PDOC a condition that requires REP to submit to the District for approval a CEMS QA/QC plan. The condition should also specify that District approval is required for any

future revisions to the QA/QC plan.

If you have any questions, let me know. Thanks --

Mark Sims  
Environmental Engineer  
Air Permits Office (AIR-3)  
U.S. EPA Region 9  
75 Hawthorne Street  
San Francisco, CA 94105  
(415) 972-3965  
(415) 947-3579 (fax)  
sims.mark@epa.gov

July 23, 2004

Mr. John Finnell  
Placer County Air Pollution Control District  
11464 B Avenue  
Auburn, CA. 95603

**Re: Roseville Electric PDOC Comments**

Dear Mr. Finnell:

Thank you for the opportunity to comment on the PDOC for the Roseville Electric Project. We have reviewed the PDOC and have made the following comments and requests.

## **Construction Mitigation**

We have reviewed the PCAPCD staff recommended mitigation techniques for the construction activities. We believe that the construction mitigation methods outlined in the CEC's Preliminary Staff Assessment (PSA) will allow the project to demonstrate that no additional impacts will occur due to these activities. Therefore, we propose that the construction mitigation techniques outlined in the PSA will be sufficient and no additional mitigation techniques are needed.

## **Specific Facility Conditions**

*Page 44, Condition 1 and 2:* Please revise the following conditions to reflect updated NO<sub>x</sub> emissions based upon available NO<sub>x</sub> ERCs. Included with these comments is an attachment that summarizes the quarterly and annual NO<sub>x</sub> emissions for both turbine technologies. Based upon available ERC's at this time, only the quarterly and annual NO<sub>x</sub> emissions are proposed to change. The hourly, maximum hourly, daily, and maximum daily will not be modified from the current PDOC. Please also note that emissions of other criteria pollutants (CO, VOC, SO<sub>2</sub>, and PM<sub>10</sub>) are not being revised.

1. If the GE LM-6000 turbines are selected, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

<b>Table 37 – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,415	12,958	17,453	15,410	31.10
PM-10	17,523	15,246	18,999	18,788	35.28

2. If the Alstom GX100 turbines are selected, emission offsets shall be provided for all calendar quarters for NOx and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SOx and VOC emissions.)

<b>Table 38 - ALSTOM GX100 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,415	12,958	17,453	15,410	31.10
PM-10	17,854	15,513	19,378	19,158	35.95

*Page 45, Condition 6:* Please revise condition 6 to reflect EPA's acceptance of the VOC/NOx offset ratio of 5.2:1.

*Condition 18:* Please include language that states "Except during startup and shutdown, the SCR....."

*Page 53: Condition 54:* Please revise Table 42 to include Excursion in the Gas Turbine Limitations.

54. The emissions from the gas turbine after air pollution controls shall not exceed the following:

<b>Table 42 - Gas Turbine PPMV Limitations Excluding Startup, Shutdown, and Excursion</b>		
NO <sub>x</sub>	CO	VOC
2.0 ppmvd @ 15% O <sub>2</sub> , 1-hour average	4 ppmvd @ 15% O <sub>2</sub> , 3-hour average	2 ppmv @ 15% O <sub>2</sub> , 3-hour average

*Page 53, Condition 55:* REP proposes the averaging period for the excursion language be changed from 1-hour to 15 minutes. REP further proposes, to allow for operating flexibility, that each quarter be allowed to have 24 fifteen minute excursion(s) rather than 6 one-hour excursions.

Also note that the turbines are water injected, not steam injected. The proposed modified language is as follows:

56. The 2.0 ppmvd NO<sub>x</sub> emission limit is averaged over 1 hour at 15 percent oxygen, dry basis. The limit shall not apply to the first six (6) 1-hour average NO<sub>x</sub> emissions above 2.0 ppmvd, dry basis at 15% O<sub>2</sub>, in any calendar quarter period for each combustion gas turbine provided that it meets all of the following requirements:

- A. This equipment operates under any one of the qualified conditions described below:
  - 1. Rapid combustion turbine load changes due to the following conditions:
    - i. Load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or
    - ii. Activation of a plant automatic safety or equipment protection system which rapidly decreases turbine load
  - 2. The first two 1-hour reporting periods following the initiation/shutdown of a evaporating cooling flow
  - 3. The first two 1-hour reporting periods following the initiation/shutdown of combustion turbine water injection
  - 4. The first two 1-hour reporting periods following the initiation of HRSG duct burners
  - 5. Events as the result of technological limitation identified by the operator and approved in writing by the District.

*Page 57, Conditions 62 and 63:* As discussed above, please revise the following conditions to reflect REP's revised quarterly and annual NO<sub>x</sub> emissions.

62. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 49 – GE LM6000 - FACILITY DAILEY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,415	12,958	17,453	15,410	31.10
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 50- ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,415	12,958	17,453	15,410	31.10

CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,854	15,513	19,378	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

*Page 57, Condition 65:* Insert the words “commencement of construction of the cooling tower basin.”

*Page 60, Condition 84:* Insert the words “commencement of construction of fire water pump foundation”.

*Page 61, Condition 97:* Insert the words “commencement of construction of IC engine foundation”.

Please feel free to contact me at 805-569-6555 or by e-mail if you have any questions or comments regarding these proposed changes to the PDOC.

Sincerely,  
**ATMOSPHERIC DYNAMICS, INC.**

**Gregory S. Darwin**

Gregory Darwin

Cc:REP

August 2, 2004

Mr. John Finnell  
Placer County Air Pollution Control District  
11464 B Avenue  
Auburn, CA. 95603

**Re: Roseville Electric PDOC Supplemental Comments**

Dear Mr. Finnell:

Roseville Electric described in its Preliminary Comments to CEC Staff that it was modifying the operation of the REP to lower its emissions of NO<sub>x</sub> to match its current offset package. Specifically, RE discussed this approach with Staff at the PSA Workshop and agreed to present in these PDOC Supplemental Comments a complete description of the modified operating profile.

At the PSA Workshop, RE discussed with Staff that it had obtained the right to purchase at least 10 tons of NO<sub>x</sub> emissions from Energy 2001, Inc. These NO<sub>x</sub> emission reductions will be created by Energy 2001, Inc. in the near future and likely before REP's commercial operation date. Energy 2001, Inc. has obtained air permit number AC-04-09 from the PCAPCD to install natural gas reciprocating engines at the Placer County landfill which will burn landfill gas. This facility is nearing completion of construction and is anticipated to commence operation shortly. Energy 2001, Inc. has entered into a Power Purchase Agreement (PPA) with RE, whereby RE will purchase this renewable energy as part of its electricity purchase portfolio. Based upon the addition of future controls to these engines, approximately 10 tons of NO<sub>x</sub> ERCs are expected to be certified. RE has entered into an option agreement with Energy 2001, Inc. to purchase at least 10 tons of these NO<sub>x</sub> ERCs.

Additionally, RE is conducting due diligence relating to purchasing up to 10 tons of NO<sub>x</sub> emission reductions from the Sacramento Air Quality Management District (SMAQMD) from its Priority Reserve Program. SMAQMD has provided indications that the REP would qualify for this program. A future application will be made for these ERC's.

As discussed with Staff at the PSA workshop, RE requests that PCAPCD incorporate the following permit conditions in the FDOC to reflect RE's modified operating schedule and corresponding reduction of NO<sub>x</sub> emissions as well as to allow an increase in NO<sub>x</sub> emissions of up to 10 tons based on the likely event that RE can secure up to 10 tons of NO<sub>x</sub> emission reductions utilizing either the Energy 2001, Inc. ERCs or the SMAQMD Priority Reserve Program or a combination of both.

*Page 44, Condition 1 and 2:* Please revise the following conditions to reflect updated NO<sub>x</sub> emissions based upon available NO<sub>x</sub> ERCs. Included with these comments is an attachment that summarizes the quarterly and annual NO<sub>x</sub> emissions for both turbine technologies. Based upon available ERC's at this time, only the quarterly and annual NO<sub>x</sub> emissions are proposed to change. The hourly, maximum hourly, daily, and maximum daily will not be modified from the current PDOC. Please also note that emissions of other criteria pollutants (CO, VOC, SO<sub>2</sub>, and PM<sub>10</sub>) are not being revised. We have also revised the condition numbers to reflect either scenario.

1a. If the GE LM-6000 turbines are selected and RE secures NO<sub>x</sub> ERCs in the amount of 31.09 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

<b>Table 37a – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
PM-10	17,523	15,246	18,999	18,788	35.28

2a. If the Alstom GX100 turbines are selected, and RE secures NO<sub>x</sub> ERCs in the amount of 31.09 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

<b>Table 38a - ALSTOM GX100 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
PM-10	17,673	15,513	19,168	19,158	35.95

1b. If the GE LM-6000 turbines are selected and RE secures NO<sub>x</sub> ERCs in the amount of 23.40 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

<b>Table 37b – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40

PM-10	17,523	15,246	18,999	18,788	35.28
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2b. If the Alstom GX100 turbines are selected, and RE secures NO<sub>x</sub> ERCs in the amount of 23.40 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

<b>Table 38b - ALSTOM GX100 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
PM-10	17,673	15,513	19,168	19,158	35.95

Page 57, Conditions 62 and 63: As discussed above, please revise the following conditions to reflect REP's revised quarterly and annual NO<sub>x</sub> emissions based upon either the 23.4 ton per year or the 31.09 ton per scenario. We have re-numbered the conditions to reflect either NO<sub>x</sub> scenario.

62a. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 49a – GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63a. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 50a- ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09

CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,673	15,513	19,168	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

62b. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 49a – GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63b. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 50a- ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
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VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,673	15,513	19,168	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

Please feel free to contact me at 805-569-6555 or by e-mail if you have any questions or comments regarding these proposed changes to the PDOC.

Sincerely,  
**ATMOSPHERIC DYNAMICS, INC.**

*Gregory S. Darwin*

Gregory Darwin

Cc:REP  
attachment

## **APPENDIX J**

### **PCAPCD Response to Comments**

The PCAPCD has received a number of comments from the applicant, Energy Commission and the U.S. EPA on the PDOC. A response is provided in this appendix to the FDOC.

The comments are numbered as received. If not numbered, comments are identified by bullets.

Please note that some of the conditions have been deleted in the FDOC and the Condition numbers changed. When applicable, the response indicates the new number of the FDOC condition.

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## **RESPONSE TO ENERGY COMMISSION STAFF COMMENTS ON THE PRELIMINARY DETERMINATION OF COMPLIANCE**

The following Energy Commission staff comments were received on June 29, 2004:

- Conditions 3 through 11: These conditions are a combination of project elements that will be fully complied with prior to the issuance of the Final Determination of Compliance. They include the identification of project emissions to be offset, offset ratios, an interpollutant offset ratio and a recantation of several District Rules. Staff suggest that it is unnecessary to include these conditions in the FDOC.

**Response:** PCAPCD concurs with this recommendation and has deleted PDOC conditions 3 through 11.

---

- Condition 21 requires that the CEMS be operational prior to the initial startup of the turbines. It has been staff's experience that the CEMS is unreliable, and may even be damaged if installed prior to the SCR and oxidation catalyst becoming operational. The SCR and oxidation catalyst will not be operational until after the turbines begin commissioning, which occurs after initial startup of the turbine. Thus, staff is unsure of the PCAPCD's intent regarding the timing of the CEMS operability. Staff recommends that CEMS operation be required prior to the cessation of commissioning when their operability will be confirmed by source testing.

**Response:** The intent of this condition was to require CEMS for NO<sub>x</sub>, CO, and O<sub>2</sub> on each gas turbine stack. The timing was a request have the CEMS functional as soon as possible. The condition will be revised as recommended. (See FDOC Condition 19).

---

- Condition 28 limits unabated operation during commissioning to 160 hours, with no ultimate limit on the duration of commissioning. Staff recommend that the duration of commissioning be limited to no more than 33 days which is generally comparable to recent licensing cases.

**Response:** PCAPCD staff concurs with the recommendation of limiting the days of operation during the commissioning and suggest the wording should indicate 33 calendar days. (See FDOC Condition 25).

---

- The compliance with Condition 29 depends on the operability of the CO portion of the CEMS, which may not be available until later in the commissioning period. Staff recommends that the PCAPCD determine a conservative, fuel based CO emission factor as a surrogate until the CO CEMS data is operable.

**Response:** The PCAPCD concurs with the recommendation. (See FDOC Condition 26).

---

- Condition 31 requires the development of a NOx emission factor specifically for the REP. Staff recommends that, in addition to NOx, the PCAPCD consider the same requirement for CO and the other pollutants that are not monitored by the CEMS (VOC, PM-10 and SOx).

**Response:** The PCAPCD concurs with the recommendation. (See FDOC Condition 29).

---

- Condition 53 sets the ammonia slip to 10 ppmv, but does not designate the percent oxygen, averaging period, or methodology to determine compliance. In the Preliminary Staff Assessment, staff is recommending that REP be limited to no more than 5 ppm @ 15% O2 average over three hours to be consistent with CARB, EPA and South Coast Air Quality Management District recommendation for combined cycle plants. Therefore staff recommends that the PCAPCD modify the condition to read "5 ppmv @ 15% O2 averaged over three hours, and include the following protocol for determining compliance, which is a typical method used by the San Joaquin Valley Air Pollution Control District:

Compliance with ammonia slip shall be demonstrated by using the following calculation procedure:

$$\text{ammonia slip ppmv @ 15\% O}_2 = ((a - (b \times c / 1,000,000)) \times 1,000,000) / b \times d$$

where

a = ammonia injection rate (lb/hr)/17 (lb/lb.mol),

b = dry exhaust gas flow rate (lb/hr)/29(lb/lb.mol.),

c = change in measured NO<sub>x</sub> concentration ppmv at 15% O<sub>2</sub>  
across catalyst,

d = correction factor

The correction factor shall be derived annually during compliance testing by comparing the measured and calculated ammonia slip.

**Response:** PCAPCD does concur with the need to define how ammonia slip is calculated. The condition will be changed to reflect this portion of the recommendation.

PCAPCD Rule 502, New Source Review, requires Best Available Control Technology (BACT) for a number of regulated pollutants but not for ammonia. The applicant provided a risk assessment which included the ammonia emissions allowed if the ammonia slip is limited to 10 ppmv. The health risk assessment showed an acceptable level.

A review of other recent power plant projects indicate ammonia slip limits of 5 or 10 ppmv. The most recent power plant project in the Sacramento Valley Area, SMUD Cosumnes River Project was approved with an ammonia slip limit of 10 ppmv.

PCAPCD is proposing the ammonia slip limit based on the above. While PCAPCD agrees with minimizing ammonia emissions, our current rules do not require limiting the level of ammonia slip to a lower level.

The PSA includes a recommendation to limit the ammonia slip to 5 ppmv based on assumptions and indications that the location of the REP project may be ammonia limited and the release of ammonia may cause formation of PM<sub>10</sub> and PM<sub>2.5</sub> downwind from the plant. The Energy Commission may establish a lower limit as a CEQA requirement. (See FDOC Condition 51)

- 
- Condition 65 requires the submittal of the cooling tower drift eliminator design 30 days prior to the “commencement of construction.” In order to provide more flexibility during construction, staff has found it reasonable to allow the cooling tower design to be submitted 30 days prior to the commencement of construction of the cooling tower.

**Response:** PCAPCD concurs with this recommendation. (See FDOC Condition 65)

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- Condition 86 allows the firewater pump to be tested up to 100 hours in a year; however, the PDOC calculations assumed that the firewater pump would be tested for no more than 50 hours per year. Staff recommend that the condition correspond with the PCAPCD calculation in the PDOC.

**Response:** PCAPCD concurs with the recommendation to be consistent with the calculations and the applicants proposed operating time. (See FDOC condition 86).

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- Condition 88 for the firewater pump and Condition 101 for the emergency generator and the firewater pump require using 500 ppm sulfur content diesel fuel. Staff recommends that applicant use 15 ppm sulfur content diesel fuel, since it is reasonably available, reduces emissions of particulate matter, and presents no significant financial burden to the applicant.

**Response:** The 500 ppm sulfur content of the diesel in this condition is representative of the current requirement of California Diesel Fuel Regulations. The California Air Resources Board recently adopted new diesel fuel regulations (August 14, 2004, Title 13 California Code of Regulations, Sections 2281-2285, Title 17 California Code of Regulations, Section 93114) that require the sale of 15 ppm sulfur diesel fuel beginning June 15, 2006.

PCAPCD contacted a local fuel supplier who indicated 15 ppm sulfur content diesel was not currently available at local bulk plants but is available by special order from Richmond. Additional costs are expected to be \$.05 to \$.10 per gallon plus delivery charges.

PCAPCD concurs with the recommendation and has changed the condition to require 15 ppm sulfur content diesel. (See FDOC conditions 88 and 101.)

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RESPONSE TO U.S. ENVIRONMENTAL PROTECTION AGENCY COMMENTS ON  
THE PRELIMINARY DETERMINATION OF COMPLIANCE

1. CO BACT. The PDOC proposes 4.0 ppmvd @ 15% O<sub>2</sub> 3-hour rolling average as CO BACT for this project. EPA recommends that CO BACT for this project be set at 2.0 ppmvd @ 15% O<sub>2</sub> 3-hour rolling average. Table B3 in the PDOC (BACT determinations for gas turbine projects recently approved by the CEC) lists CO BACT for the City of Vernon project as 2 ppmvd. However, there is no discussion in the CO BACT determination as to why 2 ppmvd was not considered for CO BACT for this project.

**Response:** The CO BACT proposed by the applicant is 4 ppmv @ 15% O<sub>2</sub>. The PCAPCD will include additional information on CO BACT in the FDOC.

PCAPCD contacted South Coast AQMD (SCAMD) and discussed the requirement to meet 2 ppmv @15% O<sub>2</sub> of CO for the City of Vernon project which includes an Alstom Turbine of the same size as this project.

SCAQMD staff indicated that this level was proposed by the applicant to minimize the quantity of CO ERCs required to offset the project. A BACT determination was not made.

Construction of the City of Vernon plant has not been completed. The District has not found a facility where CO 2 ppmv @15% O<sub>2</sub> on a three hour average has been achieved in practice. REP provided additional CO BACT analysis upon request along with a cost effective analysis. Their cost analysis indicates a cost effectiveness of \$34,500 per ton.

PCAPCD found that BACT is 4 ppmv @ 15% O<sub>2</sub>. A further discussion is included in the FDOC.

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2. Daily vs. Yearly Limits. EPA is confused by the daily versus yearly emission limits presented in the PDOC emission tables. The daily emissions appear to be about double the yearly emissions. (Example: for the Alstom turbines, daily NO<sub>x</sub> emissions are about 406 lbs/day. 406 lbs/day x 365 days = 74 tons/year. However, the yearly NO<sub>x</sub> emissions for the Alstom turbines are listed in the tables as 39 tons/year.)

Are the daily versus yearly emissions correctly listed in the PDOC? The yearly numbers imply that the facility will only operate at slightly more than half capacity/half time yet the PDOC states that the facility may operate 24 hours/day, 7 days/week. The PDOC should be revised to address this apparent discrepancy.

**Response:** The daily limits were determined by calculating maximum emissions assuming one hot start, one cold start and peak operations the remainder of the day. This is the worst case scenario for any given day of the year. They are proposing to operate at peak load for no more than 4,081 hours per year.

The sentence "The facility may operate up to 24 hours per day and 7 days per week." on page 2, Section III, Operating Schedule, has been removed for the FDOC.

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3. NH3 Slip - The PDOC sets the NH3 slip rate at 10 ppm. EPA recommends that the District set the NH3 slip rate at 5 ppm. (There is no discussion in the PDOC concerning the 10 ppm NH3 slip rate.)

**Response:** PCAPCD Rule 502, New Source Review, requires Best Available Control Technology (BACT) for a number of regulated pollutants but not for ammonia. The applicant provided a risk assessment which included the ammonia emissions allowed if the ammonia slip is limited to 10 ppmv. The health risk assessment showed an acceptable level.

A review of other recent power plant projects indicate ammonia slip limits of 5 or 10 ppmv. The most recent power plant project in the Sacramento Valley Area, SMUD Cosumnes River Project was approved with an ammonia slip limit of 10 ppmv.

PCAPCD is proposing the ammonia slip limit based on the above. While PCAPCD agrees with minimizing ammonia emissions, our current rules do not require limiting the level of ammonia slip to a lower level.

The PSA includes a recommendation to limit the ammonia slip to 5 ppmv based on assumptions and indications that the location of the REP project may be ammonia limited and the release of ammonia may cause formation of PM10 and PM2.5 downwind from the plant. The Energy Commission may establish a lower limit as a CEQA requirement.

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4. Interpollutant offsets Interpollutant Offsets -- VOC for NOx. There is no final national EPA policy on interpollutant trading for NSR offsets or on how trading ratios should be determined. Nevertheless, EPA Region 9 has accepted several such trades on a case by case basis. Based upon the small size of the emissions involved, and the high trading ratio proposed, EPA has no objection to the VOC-for-NOx ratio of 5.2 proposed for the Roseville Energy Project.

**Response:** PCAPCD concurs with the EPA response to the proposed offset ratio of 5.2 pounds of VOC ERCs for each pound of NOx required.

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5. Cold Start Performance Testing - See page 52, Specific Facility Condition 47. EPA recommends that initial cold start NOx/CO performance testing be conducted on both turbines.

**Response:** PCAPCD concurs with the EPA recommendation that an initial cold start performance test be conducted on each turbine. The condition has been changed to: Compliance with the cold start NOx, and CO mass emission limits shall be demonstrated for **each** of the gas turbines by performance testing no later than 180 days after initial operation and at least once every seven years thereafter by an ARB certified independent test firm. (See FDOC Condition 45).

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6. CEMS QA/QC Plan. EPA recommends that the District add to the Reporting/Recordkeeping section of the PDOC a condition that requires REP to submit to the District for approval a CEMS QA/QC plan. The condition should also specify that District approval is required for any future revisions to the QA/QC plan.

**Response:** PCAPCD concurs with the EPA recommendation to add a condition that requires the REP to submit a CEMS QA/QC plan to the PCAPCD for approval. Approval should also be required for any future changes to the plan. (See FDOC Condition 28).

RESPONSE TO ROSEVILLE ENERGY PARK COMMENTS ON THE  
PRELIMINARY DETERMINATION OF COMPLIANCE (7/23/04)

**Construction Mitigation**

- We have reviewed the PCAPCD staff recommended mitigation techniques for the construction activities. We believe that the construction mitigation methods outlined in the Energy Commission's Preliminary Staff Assessment (PSA) will allow the project to demonstrate that no additional impacts will occur due to these activities. Therefore, we propose that the construction mitigation techniques outlined in the PSA will be sufficient and no additional mitigation techniques are needed.

**Response:** The Energy Commission staff has proposed mitigation in the PSA which satisfies the PCAPCD. The mitigation listed in the PDOC will be removed for the FDOC.

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**Specific Facility Conditions**

- *Page 44, Condition 1 and 2:* Please revise the following conditions to reflect updated NOx emissions based upon available NOx ERCs. Included with these comments is an attachment that summarizes the quarterly and annual NOx emissions for both turbine technologies. Based upon available ERCs at this time, only the quarterly and annual NOx emissions are proposed to change. The hourly, maximum hourly, daily, and maximum daily will not be modified from the current PDOC. Please also note that emissions of other criteria pollutants (CO, VOC, SO<sub>2</sub>, and PM<sub>10</sub>) are not being revised.

1. If the GE LM-6000 turbines are selected, emission offsets shall be provided for all calendar quarters for NOx and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SOx and VOC emissions.)

<b>Table 37 – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NOx	15,415	12,958	17,453	15,410	31.10
PM-10	17,523	15,246	18,999	18,788	35.28

2. If the Alstom GX100 turbines are selected, emission offsets shall be provided for all calendar quarters for NOx and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SOx and VOC emissions.)

<b>Table 38 - ALSTOM GX100 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,415	12,958	17,453	15,410	31.10
PM-10	17,854	15,513	19,378	19,158	35.95

**Response:** Conditions 1 and 2 were revised based on REP Supplemental Comments. (See FDOC Conditions 1 and 3)

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- *Page 45, Condition 6:* Please revise condition 6 to reflect EPA's acceptance of the VOC/NO<sub>x</sub> offset ratio of 5.2:1.

**Response:** EPA has indicated acceptance of the overall VOC for NO<sub>x</sub> trading ratio for this project. This is based on 2.6 pounds of VOCs to be used to offset each pound of NO<sub>x</sub>. The offset ratio of 2.0 is also applied to obtain the final trading ratio of 2.6 x 2.0 = 5.2. Since this will be discussed in the FDOC document and a specific condition requiring the submittal of the correct value of ERCs, Condition #6 will be deleted.

- 
- *Condition 18:* Please include language that states "Except during startup and shutdown, the SCR....."

**Response:** PCAPCD does not agree with this request. The Selective Catalytic Reduction System (SCR) and oxidation catalyst should be operated at all times when the turbines are in operation after commissioning is completed. However, the wording except during commissioning will be added because the SCR and oxidation catalyst will not be available. (See FDOC Condition 15)

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- *Page 53: Condition 54:* Please revise Table 42 to include Excursion in the Gas Turbine Limitations.

54. The emissions from the gas turbine after air pollution controls shall not exceed the following:

<b>Table 42 - Gas Turbine PPMV Limitations Excluding Startup, Shutdown, and Excursion</b>		
NO <sub>x</sub>	CO	VOC
2.0 ppmvd @ 15% O <sub>2</sub> , 1-hour average	4 ppmvd @ 15% O <sub>2</sub> , 3-hour average	2 ppmv @ 15% O <sub>2</sub> , 3-hour average

**Response:** PCAPCD concurs with this recommendation. (See FDOC Condition 52)

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- *Page 53, Condition 55:* REP proposes the averaging period for the excursion language be changed from 1-hour to 15 minutes. REP further proposes, to allow for operating flexibility, that each quarter be allowed to have 24 fifteen minute excursion(s) rather than 6 one-hour excursions. Also note that the turbines are water injected, not steam injected. The proposed modified language is as follows:

56. The 2.0 ppmvd NOx emission limit is averaged over 1 hour at 15 percent oxygen, dry basis. The limit shall not apply to the first six (6) 1-hour average NOx emissions above 2.0 ppmvd, dry basis at 15% O<sub>2</sub>, in any calendar quarter period for each combustion gas turbine provided that it meets all of the following requirements:

- A. This equipment operates under any one of the qualified conditions described below:
  1. Rapid combustion turbine load changes due to the following conditions:
    - i. Load changes initiated by the California ISO or a successor entity when the plant is operating under Automatic Generation Control; or
    - ii. Activation of a plant automatic safety or equipment protection system which rapidly decreases turbine load
  2. The first two 1-hour reporting periods following the initiation/shutdown of a evaporating cooling flow
  3. The first two 1-hour reporting periods following the initiation/shutdown of combustion turbine water injection
  4. The first two 1-hour reporting periods following the initiation of HRSG duct burners
  5. Events as the result of technological limitation identified by the operator and approved in writing by the District.

**Response:** PCAPCD will change the wording in this condition to reflect the use of water injection. The condition as written in the PDOC was provided to allow a limited number of excursions. REP has not provided CEMS data from other similar power plant or data from the manufacturer which would demonstrate a need to change from one hour to fifteen minute periods. (See FDOC Condition 53).

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- *Page 57, Conditions 62 and 63:* As discussed above, please revise the following conditions to reflect REP's revised quarterly and annual NOx emissions.

62. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 49 – GE LM6000 - FACILITY DAILEY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,415	12,958	17,453	15,410	31.10
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 50- ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,415	12,958	17,453	15,410	31.10
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,854	15,513	19,378	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

**Response:** This comment has been replaced by a similar comment received in the REP supplemental comments on August 2, 2004. These conditions have been revised. (See FDOC Conditions 59 and 60)

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- *Page 57, Condition 65:* Insert the words “commencement of construction of the cooling tower basin.”

**Response:** The wording has been changed to “commencement of construction of the cooling towers basin”. (See FDOC condition 65).

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- *Page 60, Condition 84:* Insert the words “commencement of construction of fire water pump foundation”.

**Response:** The wording has been changed to the requested “commencement of construction of the fire water pump foundation.” (See FDOC Condition 84).

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- *Page 61, Condition 97:* Insert the words “commencement of construction of IC engine foundation”.

**Response:** The wording has been changed to the requested “commencement of construction of the emergency generator I.C. engine foundation.” (See FDOC Condition 97)

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**RESPONSE TO ROSEVILLE ENERGY PARK SUPPLEMENTAL COMMENTS  
ON THE PRELIMINARY DETERMINATION OF COMPLIANCE (8/02/04)**

- *Page 44, Condition 1 and 2:* Please revise the following conditions to reflect updated NO<sub>x</sub> emissions based upon available NO<sub>x</sub> ERCs. Included with these comments is an attachment that summarizes the quarterly and annual NO<sub>x</sub> emissions for both turbine technologies. Based upon available ERCs at this time, only the quarterly and annual NO<sub>x</sub> emissions are proposed to change. The hourly, maximum hourly, daily, and maximum daily will not be modified from the current PDOC. Please also note that emissions of other criteria pollutants (CO, VOC, SO<sub>2</sub>, and PM<sub>10</sub>) are not being revised. We have also revised the condition numbers to reflect either scenario.

1a. If the GE LM-6000 turbines are selected and RE secures NO<sub>x</sub> ERCs in the amount of 31.09 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

<b>Table 37a – GE LM6000 - OFFSETS REQUIRED</b>					
POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
PM-10	17,523	15,246	18,999	18,788	35.28

2a. If the Alstom GX100 turbines are selected, and RE secures NO<sub>x</sub> ERCs in the amount of 31.09 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

**Table 38a - ALSTOM GX100 - OFFSETS REQUIRED**

POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
PM-10	17,673	15,513	19,168	19,158	35.95

1b. If the GE LM-6000 turbines are selected and RE secures NO<sub>x</sub> ERCs in the amount of 23.40 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

**Table 37b – GE LM6000 - OFFSETS REQUIRED**

POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
PM-10	17,523	15,246	18,999	18,788	35.28

2b. If the Alstom GX100 turbines are selected, and RE secures NO<sub>x</sub> ERCs in the amount of 23.40 tons, emission offsets shall be provided for all calendar quarters for NO<sub>x</sub> and PM-10 in the following amounts, at the offset ratio specified in the condition 10. (Offsets are not required for CO, SO<sub>x</sub> and VOC emissions.)

**Table 38b - ALSTOM GX100 - OFFSETS REQUIRED**

POLLUTANT	QUARTER 1 (lbs/quarter)	QUARTER 2 (lbs/quarter)	QUARTER 3 (lbs/quarter)	QUARTER 4 (lbs/quarter)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
PM-10	17,673	15,513	19,168	19,158	35.95

- *Page 57, Conditions 62 and 63:* As discussed above, please revise the following conditions to reflect REP's revised quarterly and annual NO<sub>x</sub> emissions based upon either the 23.4 ton per year or the 31.09 ton per scenario. We have re-numbered the conditions to reflect either NO<sub>x</sub> scenario.

62a. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 49a – GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63a. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 50a- ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	15,546	13,412	17,646	15,572	31.09
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,673	15,513	19,168	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

62b. If the GE LM6000 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 49a – GE LM6000 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
CO	21,625	19,737	23,500	23,322	44.09
VOC	6,046	5,188	6,596	6,514	12.17
PM <sub>10</sub>	17,523	15,246	18,999	18,788	35.28
SO <sub>2</sub>	3,331	2,838	3,630	3,587	6.69

63b. If the Alstom GX100 turbines are selected for the project, the total facility emissions shall not exceed the following quarterly emission rates:

<b>Table 50a- ALSTOM GX100 - FACILITY QUARTERLY EMISSION LIMITS</b>					
POLLUTANT	QUARTER 1 (lbs)	QUARTER 2 (lbs)	QUARTER 3 (lbs)	QUARTER 4 (lbs)	Tons/year
NO <sub>x</sub>	11,337	7,429	15,647	12,379	23.40
CO	27,121	33,872	28,515	30,202	59.86
VOC	5,832	7,455	6,672	6,890	13.42
PM <sub>10</sub>	17,673	15,513	19,168	19,158	35.95
SO <sub>2</sub>	3,400	2,893	3,709	3,663	6.83

**Response to REP Supplement Comments:** REP is proposing to change their potential to emit for NO<sub>x</sub> only to match the quantity of ERCs available for surrender to offset the emissions. This is a reduction in allowable emissions. No other operating parameter limitations are changes are proposed in this comment.

The comment offers two offset scenarios for each turbine option, one with only the current ERCs package currently under option by REP and one with the addition of 10 tons per year from potential reductions at Energy 2001 or from purchase from the SMAQMD's bank.

This request was forwarded to the U.S. EPA staff for feedback. Also forwarded was the August 5, 2004 letter from Energy 2001. After further consulting with U.S. EPA staff, PCAPCD requested Roseville Electric to select one of the options proposed in this comment but not both.

Roseville Electric selected the 31.09 ton per year of NO<sub>x</sub> emission level and PCAPCD has incorporated this scenario into the FDOC. See the sections on emissions and offsets.